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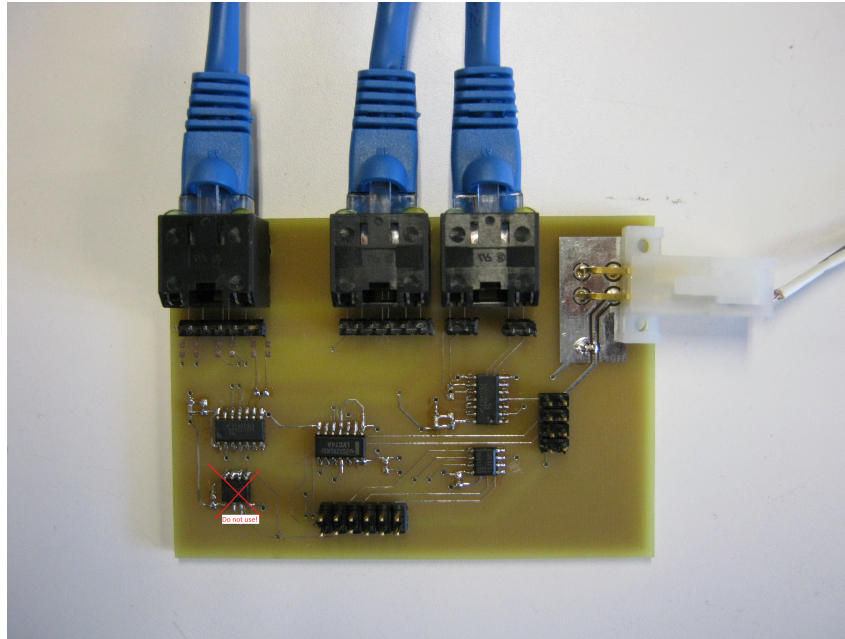
Tuning a Quad Module using DeMux Boards

1. Power
   A) Power quad module, each chip needs 600mA and the mux need 100 mA (2.5A min).
   B) Power two (2) demux boards with 3.3V each, needs 55mA each

2. Connectors
   A) Connect RJ45 DO1 output from flex into RJ45 connector on demux board (left contains single DO1 input)
   B) Connect output 1 (middle RJ45 in fig. 1) from demux board into input 1 of Burn-in-Card
   C) Connect output 2 (rightmost RJ45 in fig. 1) from demux board into input 2 of Burn-in-Card
   D) Connect RJ45 DO2 output from flex into RJ45 connector on demux board
   E) Connect output 1 (middle RJ45 in fig. 1) from demux board into input 3 of Burn-in-Card
   F) Connect output 2 (rightmost RJ45 in fig. 1) from demux board into input 4 of Burn-in-Card
3. Structure
   A) DO1 and DO2 contain muxed data from quad module
   B) Output 1 (on demux) contains CMD and CLK that bypasses entire demuxboard and is fed directly into quad module
   C) Output 2 uses CLK (same CLK as input 1,2,3,4) for demuxing on flip-flop

4. STControl settings

A) Set configuration as shown in fig. 2
  i. Auto-Save is recommended to be able to identify GA with FE channel
  ii. 80MBit/s and 160MBit/s do not work, only use 40MBit/s
B) Enable Manchester Encoding, clock phase: 1
C) Change CLK0 to zero (0) for all chips under "FE Global"
D) Initialize and configure all modules, check "Read chip index" from fig.2 and it should have changed to static values (e.g. FE0 Channel 0, etc....)

5. Run analog and digital tests
   A) Analog test
     i. Change "1/Frequency" to 8000, change to steps: 8 and steps_8
     ii. Scan takes about 2 minutes to complete
   B) Digital test
     i. Change "1/Frequency" to 8000, change to steps: 32 and steps_32
     ii. Scan takes about 2 minutes to complete
   C) Verify that chips are in working condition

6. Run Threshold Scan
   A) Change "Vthin_AltFine" in "FE Global" to 130 for all four chips, change "Vthin_AltCourse" to 0
   B) Change "1/Frequency" to 8000, change to steps: 8 and steps_8
   C) Change "#steps" in loop 0 to 26 (51 steps preferably)
   D) Scan takes about 10 minutes to complete (20 minutes for 51)
   E) Results
     i. "PLOTSCURVE_MEAN" shows distribution of threshold for pixels in chip, aim for 3000e at first
     ii. If mean is less than 2900 increase "Vthin_AltFine" by 10, if mean is greater than 3100 decrease "Vthin_AltFine" by 10
   F) Repeat steps B-E until all chips have mean between 2900-3100

7. Noise
   A) "Plot occupancy" will show you the result at every step in the threshold scan
   B) Go through each step per chip and identify noisy columns, then disable them

8. Run TDAC_TUNE
   A) Change "1/Frequency" to 8000, change to steps: 8 and steps_8
   B) Scan takes about 1 minute to complete
   C) Results
     i. "TDAC_OCC" should have a mean of 200
     ii. "TDAC_T" should have a mean of 15
   D) Save cfg as new file (in case tuning failed)

9. Run Threshold Scan
   A) Repeat steps 6B-6D
   B) Mean should remain between 2900-3100 but sigma should be significantly smaller (about 50)

10. More tuning
    A) If default setting of scan is "1/Frequency" = 4000, and mask steps: 3 steps_3, Change "1/Frequency" to 8000, change to steps: 8 and steps_8
    B) If default setting of scan is "1/Frequency" = 8000, and mask steps: 6 steps_6, Change "1/Frequency" to 8000, change to steps: 32 and steps_32